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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/541,354	03/31/2000	Raphael Yair	32-NM-5321	3181

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EXAMINER	
FETZNER, TIFFANY A	
ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 12/07/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/541,354	Raphael Yalr et al.,
Examiner	**Art Unit**
Tiffany A. Fetzner	2862

-- The MAILING DATE of this communication appears on th cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Mar 31, 2000*

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-28* is/are pending in the applica

4a) Of the above, claim(s) _____ is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-28* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *Mar 31, 2000* is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED ACTION

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Specification

2. The disclosure is objected to because of the following informalities: On page 14 line 31 **insert** a blank space between the words "circuit" and "104" (i.e., "steering circuit 104" not steering "circuit104") . Appropriate correction is required.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: **Figure 8** includes reference number **136** that is not mentioned in applicant's description. Correction is required.

4. Applicant is required to submit a proposed drawing correction in response to this Office Action. Any proposal by the applicant for amendment of the drawings to cure defects **must consist of two parts:**

A. A separate letter to the Draftsman in accordance with M.P.E.P. (608.02(r); and

B. A print or pen-and-ink sketch showing changes in red ink in accordance with M.P.E.P. (608.02(v)).

IMPORTANT NOTE: The filing of new formal drawings to correct the noted defect may be deferred until the application is allowed by the examiner, but the print or pen-and-ink sketch with proposed corrections shown in red ink is required in response to this Office Action, and *may not be deferred.*

5. ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. **Claims 1-15, 18-19, 23-25,** and **28** are rejected under **35 U.S.C. 102(e)** as being anticipated by **Souza et al.**, US patent 6,144,205 issued November 7th 2000 filed November 19th 1998; or in the alternative. **Claims 1-15, 18-19, 23-25,** and **28** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Souza et al.**, US patent 6,144,205 issued November 7th 2000 filed November 19th 1998.

10. **Claims 1-15, 18-19, 23-25,** and **28** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Souza et al.**, US patent 6,144,205 issued November 7th 2000 filed November 19th 1998, in view of applicant's admission of what is conventionally well-known and well-established as general knowledge concerning the nature of thyristors (i.e. silicon-controlled rectifiers or SCRs); on page 15 lines 5-16 of applicant's disclosure. The examiner notes that it is well established and well-known to individuals of ordinary skill in the MRI / NMR imaging art, and the area of electronics that a silicon-controlled rectifier is inherently a type of thyristor, that is both conventional and in common use.

11. With respect to **Claim 1**, **Souza et al.**, teaches "A switching circuit" (i.e. See Figures 5, 6) "to linearly conduct current between a source and a load, the circuit comprising: a switching device" (i.e. a photosensitive semiconductor switch, or a conventional semiconductor switch) "coupled between the source" (i.e. the resonant circuit, of the MR device is interpreted by the examiner as "the source") "and the load", (i.e. the reactive electrical device is interpreted by the

examiner as "the load"). [See col. 2 57-65, Figure 5, Figure 6] **Souza et al.**, teaches and suggests that "the switching device"(i.e. a photosensitive semiconductor switch, or a conventional semiconductor switch) "has a conductive state in which a first portion of the current is conducted between the source and the load during a first phase of operation the first phase of operation dependent on the magnitude of the current;" [See col. 5 lines 20-33] The examiner notes that **Souza et al.**, teaches that the photosensitive device could comprise a light-activated silicon-controlled rectifier (i.e. a light-activated SCR); PIN-type photodiode, a phototransistor, a phtotdarlington transistor pair, or a photo-FET; and that the semiconductor switch could comprise or a PIN type diode, transistor, FET, or a conventional non-light activated SCR. [See col. 5 lines 14-17, col. 5 lines 64-65, col. 6 lines: 4-5, 13-15, 21-26, 30-32, 43-45, 48-51, 58-61] Conventionally, an SCR is a type of thyristor, and thyristors are inherently "dependent on the magnitude of the current", This dependency is also suggested by the **Souza et al.**, reference, [See col. 5 line 1 through col. 6 line 63; specifically, col. 6 lines 4-13, and col. 6 lines 41-61] and is alternatively taught to be conventional by the applicant. [See page 15 lines 5-16 of applicant's disclosure]

12. Additionally, **Souza et al.**, teaches and suggests "a current steering circuit" (i.e. interpreted by the examiner as the blocking loops 187, 194, 201 taught by **Souza et al.**, in Figures 4, 5, and 6) "coupled between the source" (i.e. the resonant circuit, of the MR device is interpreted by the examiner as "the source") "and the load", (i.e. the reactive electrical device or preamplifier 156 is interpreted by the examiner as "the load"). [See col. 2 57-65, Figure 5, Figure 6] "the current steering circuit having a conductive state in which a second portion of the current

is conducted between the source and the load during a second phase of operation" (i.e. the signal induced from induced transmit fields, is electrically isolated, or conducted away from sensitive electronics, in the receive mode) [See col. 3 lines 6-19, col. 5 line 20 through col. 6 line 63].

13. It would have been obvious to one of ordinary skill in the art, at the time that the invention was made that the teachings of **Souza et al.**, directly suggest, that the current through the SCR is magnitude dependent because the impedance of the SCR controls the conductivity of the SCR switch. [See col. 5 line 1 through col. 6 line 63 in general] Applicant's admission can be combined with the teachings of **Souza et al.**, because applicant's invention is directed toward a circuit to conduct current between a source and a load, and the circuit of **Souza et al.**,is directed toward a MR circuit to conduct current between a source and a load, that van be used functionally in any MR system to disable one component from another. [See col. 6 lines 58-61].

14. With respect to **Claim 10, Souza et al.**, teaches and suggests "A magnetic resonance imaging (MRI) system to perform an MRI scan in accordance with a pulse sequence, [See abstract, Figure 3] "the pulse sequence including at least a first pulse," [See col. 3 lines 63 through col. 4 line 12.] **Souza et al.**, teaches and suggests that "the system comprises: a gradient coil assembly to generate a gradient magnetic field during the MRI scan;" [See Figure 3 col. 4 lines 13-29] "an amplifier to drive the gradient coil assembly such that the gradient coil assembly generates the gradient magnetic field in accordance with the pulse sequence;" [See Figure 3 col. 4 lines 13-29] "and a switch assembly to provide a conductive path between the amplifier and the gradient coil assembly,"[See Figure 3 col. 4 lines 13-29, and col. 6 lines 58-61 where **Souza et al.**, teaches that the invention can be used disable or enable any MRI component that functionally

is subject to transmitting and receiving RF energy. Therefore, the **Souza et al**., reference suggests the possibility of using the inventive switch to enable or disable (i.e. provide) a conductive path between a gradient amplifier and gradient coil assembly, which suggests applicant's claim limitation.]

15. Additionally, **Souza et al**., teaches and suggests that "the switch assembly comprises: a first switching device" (i.e. semiconductor switch 216) "having a conductive state during a first portion of the first pulse of the pulse sequence; and a second switching device" (i.e. semiconductor switch 216) "coupled in parallel with the first switching device", [See figure 6, col. 6 lines 19-61] "the second switching device having a conductive state during a second portion of the first pulse of the pulse sequence." The examiner notes that the conductive states of the **Souza et al**., switches inherently change based on the magnitude of the current, or voltage, therefore as a pulse increases and decreases during first and second portions of a pulse sequence the conductive state for the respective switches inherently change.

16. **Souza et al**., lacks directly teaching that "the conductive path is provided between the amplifier and the gradient coil assembly during substantially the entire duration of the first pulse." However, it is well known in the MRI / NMR art that an NMR pulse sequence, it is desirable to amplify the signals produced by the gradient coil assembly, and that no amplification should occur unless a pulse is being applied, therefore, It would have been obvious to one of ordinary skill in the art, at the time that the invention was made, to ensure that while the gradient coil assembly is being used, to apply a pulse, (i.e. for the entire duration of the pulse) that the path between the amplifier and the gradient coil remained conductive. Stated another way, the activation of a

gradient coil, activates the gradient amplifier for that coil, during the entire duration of the applied gradient pulse. The examiner notes that the **Souza et al.**, reference suggests disabling and enabling antennas/coils which transmit and / or receive NMR signals, because the same functional principles that apply to enabling or disabling an RF transmit / receive antenna, during excitation; are also readily applicable to an RF gradient coil assembly which necessarily enables, or disables gradient pulses, during a pulse sequence. The examiner considers the enabling, or disabling, of RF antennas and gradient coils to be functionally equivalent, and within the scope of the **Souza et al.**, reference. The same reasons for rejection, obviousness, and motivation to combine, given in the rejection of **claim 1** also apply to **claim 10** and need not be reiterated.

17. With respect to **Claim 18**, and corresponding method **claim 23**, "A magnetic resonance imaging (MRI) system for acquiring MRI data, the stem comprising: a processor to control acquisition of the MRI data in accordance with a program stored in a memory, the program including an imaging protocol having a sequence of gradient pulses and a sequence of detection pulses; a gradient amplifier to drive the gradient coil assembly in accordance with the sequence of gradient pulses; an MRI scanner to perform an MRI scan in accordance with the stored imaging protocol, the MRI scanner comprising a magnet, a gradient coil assembly, and an RF coil assembly, the gradient coil assembly generating a gradient magnetic field in accordance with the sequence of pulses; a switch assembly coupled between the gradient amplifier and the gradient coil assembly to provide a conductive path therebetween, the switch assembly comprising: a first switching device having a conductive state during a first portion of a first gradient pulse; and a second switching device coupled in parallel with the first switching device, the second switching

device having a conductive state during a second portion of the first gradient pulse, wherein the conductive path is provided between the gradient amplifier and the gradient coil assembly during substantially the entire duration of the first pulse; and an RF detector coupled to the RF coil to detect MRI data resulting from the MRI scan in accordance with the sequence of detection pulses." These claims are just another version of independent **claims 1**, and **10** combined which also includes the limitation of "an RF detector / receiver coupled to the RF coil to detect MRI data resulting from the MRI scan in accordance with the sequence of detection pulses."

18. The **Souza et al.**, reference teaches, and shows "an RF detector coupled to the RF coil to detect MRI data resulting from the MRI scan in accordance with the sequence of detection pulses." [See Figure 3]. All of the other limitations are taught and suggested from col. 3 line 44 through col. 6 line 61, in connection with Figures 3, 4, 5 and 6.] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1,** and **10** also apply to **claim 18,** and **corresponding method claim 23**.

19. With respect to **Claim 2**, **Souza et al.**, teaches and suggests that "the switching device" (i.e. a photosensitive semiconductor switch, or a conventional semiconductor switch) "is in a non-conductive state during the second phase of operation." [See col. 5 lines 34-44, col. 6 lines 36-61, col. 2 lines 59-63, col. 3 lines 6-19] The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 2**.

20. With respect to **Claim 3**, **Souza et al.**, teaches and suggests that "the current steering circuit (i.e. the blocking loop) is in a non-conductive state during at least one phase of operation." [See col. 5 lines 34-44, col. 3 lines 6-19, and col. 5 line 20 through col. 6 line 63 in general.] The

same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 3**.

21. With respect to **Claim 4**, **Souza et al.**, teaches and implicitly suggests that "the second phase of operation occurs when the magnitude of the current is below a non-zero threshold value", because SCR switches which are taught by **Souza et al.**, [see the rejection of **claim 1**] inherently become conductive or non-conductive "below a non-zero threshold value", and are used to separate, isolate, or distinguish, the transmit and receive modes in the **Souza et al.**, apparatus. The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 4**.

22. With respect to **Claim 5**, **Souza et al.**, teaches and implicitly suggests that "the second phase of operation occurs when the switching device transitions from the conductive state to a non-conductive state." [See col. 5 lines 20-44, col. 3 lines 6-19] The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 5**.

23. With respect to **Claim 6**, **Souza et al.**, lacks directly stating that "the switching device transitions from the conductive state to a non-conductive state when the absolute value of the magnitude of the current falls below a non-zero threshold value." However, applicant admits on page 15 lines 5-16 that SCR thyristors conventionally, transition "from the conductive state to a non-conductive state dependent upon the magnitude of the current flowing through the thyristor." Additionally in order to obtain the magnitude of the current, the absolute value of the current is necessarily taken, by convention, because a magnitude by conventional definition is a measurement in which the absolute value is taken. Therefore, the presence of the SCR switch

taught by **Souza et al**., implicitly suggests that "the switching device transitions from the conductive state to a non-conductive state when the absolute value of the magnitude of the current falls below a non-zero threshold value", and reads on applicant's claim. The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 6**.

24. With respect to **Claim 7**, **corresponding claim 14** which depends from **independent claim 10** and **corresponding claim 19** which depends from **independent claim 18; Souza et al**., teaches that "the switching device comprises a silicon controlled rectifier (SCR)." [See col. 5 lines 14-17, col. 5 lines 64-65, col. 6 lines: 4-5, 13-15, 21-26, 30-32, 43-45, 48-51, 58-61] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 10, 18,** also apply to **claims 7, 14, 19**.

25. With respect to **Claim 8**, and **corresponding claim 15** which depends from **independent claim 10 Souza et al**., suggests that the "steering circuit (i.e. the blocking loops) comprises a transistor to conduct the current during the second phase of operation." [See Figure 5, Figure 6, and col. 6 lines 19-51, where a second semiconductor which may comprise a transistor is taught in connection with the various combinations suggested for Figures 5 and 6.] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 7, 10** also apply to **claims 8, 15**.

26. With respect to **Claim 9**, **Souza et al**., suggests that the "switching device comprises a pair of anti-parallel silicon controlled rectifiers." [See col. 5 line 61 through col. 6 line 13, col. 6 lines 41-51] The same reasons for rejection, obviousness, and motivation to combine that apply to **claim 1** also apply to **claim 9**.

27. With respect to **Claim 11**, Because the **Souza et al.**, reference teaches that the first switching device may comprise an SCR. [See col. 5 lines 14-17, col. 5 lines 64-65, col. 6 lines: 4-5, 13-15, 21-26, 30-32, 43-45, 48-51, 58-61] It is inherent to the **Souza et al.**, reference suggests and includes within its scope that the first portion of the first pulse of the pulse sequence is dependent on the magnitude of current conducted through the first switching device." [See col. 3 lines 6-19 and col. 5 line 1 through col. 6 line 61 in general] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4, 5, 6, 7,** and **10** also apply to **claim 11**.

28. With respect to **Claim 12**, the **Souza et al.**, reference teaches and suggests that "the second portion of the first pulse occurs when the magnitude of the current conducted through the first switching device reaches a non-zero threshold value", for the same rejection reasons given in the rejection of **claim 4** that need not be reiterated. The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4, 5, 6, 7, 10** and **11** also apply to **claim 12**.

29. With respect to **Claim 13**, the **Souza et al.**, reference teaches and suggests that the "first switching device and the second switching device" may comprise a light-activated silicon-controlled rectifier (i.e. a light-activated SCR); PIN-type photodiode, a phototransistor, a phtotdarlington transistor pair, or a photo-FET; and that the semiconductor switch could comprise or a PIN type diode, transistor, FET, or a conventional non-light activated SCR. [See col. 5 lines 14-17, col. 5 lines 64-65, col. 6 lines: 4-5, 13-15, 21-26, 30-32, 43-45, 48-51, 58-61] The devices shown in figures 5, and 6 are diodes which inherently are "uni-directional current-conducting devices", therefore the **Souza et al.**, reference teaches and suggests that the

"first switching device and the second switching device are uni-directional current-conducting devices, each of the first and second switching devices conducting current in the same direction. [See col. 5 line 61 through col. 6 line 61, and Figures 5, 6 where parallel and anti-parallel configurations are taught, which suggests that current can be conducted in the same direction or in opposite directions.] The **Souza et al.**, reference lacks directly teaching that the conductive direction is "between the amplifier and the gradient coil assembly", however as mentioned in the rejection of **claim 10**, the examiner considers the enabling, or disabling, of RF antennas and gradient coils to be functionally equivalent, and within the scope of the **Souza et al.**, reference., and conventionally in all NMR / MRI devices there must be a conductive path between the gradient amplifier(s) and the gradient assembly coil(s); just like there is a conductive path between the RF amplifier and the RF antenna assembly. The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4, 5, 6, 7,** and **10** also apply to **claim 13**.

30. With respect to **Claim 24**, This claim is just the method version of **claims 1, 4, 10,** and **18** combined. Therefore, The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4, 10, 18** and **23** also apply to **claim 24** and need not be reiterated.

31. With respect to **Claim 25**, This claim is just the method version of **claims 1, 5, 10,** and **18** combined. Therefore, The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 4, 10, 18,** and **23** also apply to **claim 24** and need not be reiterated.

32. With respect to **Claim 28**, The Souza reference teaches and suggests "generating MRI data as a result of the MRI scan; and detecting the MRI data", because the purpose of generating, and detecting MRI data as a result of an MRI scan is a main purpose of the entire **Souza et al.**,

reference. [See Figures 1-6, the abstract, and col. 1 line 1 through col. 8 line 64.] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 10, 18,** and **23** also apply to **claim 28** and need not be reiterated.

33. **Claims 16-17, 20-22,** and **26-27** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Souza et al.**, US patent 6,144,205 issued November 7th 2000 filed November 19th 1998; in view of **Vavrek et al.,** US patent 5,311,135 issued May 10th 1994 and in further view of applicant's admission of what is conventionally well-known and well-established as general knowledge concerning the nature of thyristors (i.e. silicon-controlled rectifiers or SCRs); on page 15 lines 5-16 of applicant's disclosure.

34. With respect to **Claim 16, corresponding system claim 20** which depends from **independent claim 18** and **corresponding method claim 26** which depends from **independent claim 23;** The **Souza et al.**, reference lacks teaching that teaches that "the switching assembly comprises: a third switching device coupled in parallel with the first switching device, the third switching device having a conductive state during a first portion of a second pulse of the pulse sequence, the second pulse having a polarity opposite of the first pulse; and a fourth switching device coupled in parallel with the third switching device, the second switching device having a conductive state during a second portion of the second pulse of the pulse sequence, such that the conductive path is provided between the amplifier and the gradient coil assembly during substantially the entire duration of the second pulse." However, **Vavrek et al.,** shows in Figures 3 and 9 an MRI gradient coil switching device circuit, that meets the criteria set forth by applicant. [See Figures 3, 9 and the teachings of the **Vavrek et al.,** references concerning Figures 3 and 9]

The examiner notes that the entire **Vavrek et al.,** reference is applicable because the invention of **Vavrek et al.,** is a way to couple and decouple multiple MRI gradient field coils or sets of coils, which must be switched in the course of an MRI pulse sequence, and is one of applicant's main concerns. Additionally, since the **Vavrek et al.,** reference is directed mainly toward quadrature detection, enabling and disabling at least two sets of two coils, which must be switched is inherent. The **Souza et al.**, reference is concerned with the effective switching, (i.e. enabling and disabling) of RF antenna / coil devices; in order to reduce electrical hazards to the patient, and reduce the number of components required. [See col. 5 line 1 through col. 6 line 61].

35. It would have been obvious to one of ordinary skill in the art, at the time that the invention was made, that modifying the quadrature switches of the **Vavrek et al.,** reference, to include the switches of **Souza et al.**, reference is desirable because the switches of **Souza et al.**, reduce and / or eliminate the potential hazard of electrical voltages and currents that arise from any source in the MRI system, and injuring a patient, which increases the safety of MRI procedures. Additionally, **Souza et al.**, teaches that the switches of the **Souza et al.**, reference can be used in any MRI system to enable or disable, any functionally similar reactive electrical device, and the examiner considers the quadrature gradient coil system of the **Vavrek et al.,** reference, to be functionally similar to the antenna system of the **Souza et al.**, reference. [See **Souza et al.**, col. 6 lines 58-61, and the entire reference in general.] The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 10, 18, 23** also apply to **claims 16, 20,** and **26**.

36. With respect to **Claim 17**, **corresponding system claim 22** which depends from **independent claim 18** and **corresponding method claim 27** which depends from **independent**

method claim 23; The **Souza et al.**, reference lacks teaching that teaches that "the gradient coil assembly comprises a first gradient coil set and a second gradient coil set, and the switch assembly selectively couples the amplifier to either the first gradient coil set or the second gradient coil set." However, the **Vavrek et al.,** reference, suggests and shows this limitation. [See Figures 3, 9, col. 7 lines 36-64]. The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 10, 16, 18, 20, 23** and **26** also apply to **claims 17, 22,** and **27** and need not be reiterated.

37. With respect to **Claim 21**, The **Souza et al.**, reference lacks teaching that teaches that "the first switch device and the third switching device each comprises a silicon controlled rectifier." However, the semi-conductor switches in the **Souza et al.**, reference, as taught in the rejection of **claims 7, 14,** and **19**; suggest that silicon controlled rectifiers can be used for each semi-conductor switch. Therefore, it would have been obvious to one of ordinary skill in the art, at the time that the invention was made that the **Souza et al.**, reference can be modified to enable or disable one or more antennas, or gradient coils, and that each switch could comprise a silicon controlled rectifier. Therefore, the examiner considers the situation of "the first switch device and the third switching device each comprising a silicon controlled rectifier."to be within the scope of the **Souza et al.**, reference The same reasons for rejection, obviousness, and motivation to combine that apply to **claims 1, 7, 10, 14, 18, 19, 20,** and **23**, also apply to **claim 21.**

Conclusion

38. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is (703) 305-0430. The examiner

can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

39. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams, can be reached on (703) 305-4705. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3432 .

40. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0956.

Tiffany A. Fetzner

TAF

November 29, 2001

Hezron E. Williams

HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800